

What is claimed is:

1. A display device comprising an active matrix substrate having a driver circuit section composed of a plurality of polycrystalline silicon thin film transistors, a counter substrate, a liquid crystal filled between the active matrix substrate and the counter substrate, and an individually-wired line array for supplying electric power or a signal such as a clock signal and a data signal to a plurality of circuit elements comprised in the driver circuit section, wherein the individually-wired line array is extended to a peripheral portion of the active matrix substrate, the display device characterized in that:

the peripheral portion of the active matrix substrate has an insulator having a via hole and a multi-layer bus line-equipped section having a bus line formed on the insulator, the bus line is connected to the individually-wired line array via the via hole, and the bus line has a connecting terminal for connecting the display device to an external circuit.

2. A display device according to claim 1, wherein the insulator is a pre-formed resin substrate having a bus line formed on a surface thereof and a via hole formed in the interior thereof, and the resin substrate is bonded to the peripheral portion of the active matrix substrate to form the multi-layer bus line-equipped section.

3. A display device according to claim 2, wherein the resin substrate is composed of aramid-epoxy resin.

4. A display device according to claim 2, wherein an electrically conductive paste is filled in the via hole.

5. A display device according to claim 2, wherein the resin substrate has a multi-layer structure having a plurality of layers in which a bus line is provided on a surface of an inner layer thereof as well as on a surface of the uppermost layer thereof, and the bus lines are selectively connected to each other via a via hole formed in each of the layers to form a three-dimensional wiring structure.

10 6. A display device according to claim 4, wherein the electrically conductive paste partially protrudes from a lower opening of the via hole, and the active matrix substrate and the resin substrate are bonded together with the protruding portion of the electrically conductive paste.

15 7. A display device according to claim 5, wherein an electrically conductive paste is filled in the via hole; the electrically conductive paste protrudes from a lower opening of the via hole; and the electrically conductive paste partially protrudes from a lower opening of the via hole, and the active matrix substrate and the resin substrate are bonded together with the protruding portion of the electrically conductive paste.

20 8. A display device according to claim 2, wherein the resin substrate and the active matrix substrate are bonded with an adhesive composed of a material having thermoplastic property.

9. A display device according to claim 2, wherein the resin substrate and the active matrix substrate are bonded with an adhesive composed of an anisotropic conductive resin or a silver paste.

10. A display device according to claim 2, wherein the resin substrate is
5 a film substrate, and is detachably bonded to the active matrix substrate.

11. A display device according to claim 10, wherein the film substrate is
made of a resin comprising polyimide or epoxy.

12. A display device according to claim 2, wherein a semiconductor chip
comprised in the external circuit is mounted on the resin substrate and is
10 connected to the bus line.

13. A display device according to claim 12, wherein the semiconductor
chip is buried in the via hole.

14. A display device according to claim 1, wherein the bus line in the
multi-layer bus line-equipped section is a thick film formed by printing.

15. A display device according to claim 14, wherein the insulator in the
multi-layer bus line-equipped section is a thick film formed by printing.

16. A display device comprising an active matrix substrate having a
driver circuit section composed of a plurality of polycrystalline silicon thin
film transistors, a counter substrate, a liquid crystal filled between the
20 active matrix substrate and the counter substrate, and an

individually-wired line array for supplying electric power or a signal such as a clock signal and a data signal to a plurality of circuit elements comprised in the driver circuit section, wherein the individually-wired line array is extended to a peripheral portion of the active matrix substrate, the display device characterized in that:

the active matrix substrate has a recessed groove formed in the peripheral portion; and

a bus line to be connected to the individually-wired line array is buried in the groove.

10 17. A display device comprising an active matrix substrate having a driver circuit section composed of a plurality of polycrystalline silicon thin film transistors, a counter substrate, a liquid crystal filled between the active matrix substrate and the counter substrate, and an individually-wired line array for supplying electric power or a signal such as a clock signal and a data signal to a plurality of circuit elements comprised in the driver circuit section, wherein the individually-wired line array is extended to a peripheral portion of the active matrix substrate, the display device characterized in that:

the active matrix substrate has an organic resin layer in the peripheral portion thereof, and a bus line to be connected to the individually-wired line array is buried in the organic resin layer.

18. A display device according to claim 17, wherein the organic resin is composed of a photosensitive resin; the organic resin has a via hole formed

by photolithography; and the bus line is electrically connected to the individually-wired line array via a connecting electrode filled in the via hole.

19. A display device according to claim 18, wherein the bus line is an electrically conductive thermosetting resin formed by screen printing.

5 20. A display device according to claim 16, wherein the bus line is a pre-formed metal fine wire.

21. A display device according to claim 17, wherein the bus line is a pre-formed metal fine wire.

10 22. A display device according to claim 16, wherein the bus line is produced by plating.

23. A display device according to claim 17, wherein the bus line is produced by plating.

15 24. A display device according to claim 22, wherein the bus line produced by plating forms a layered structure comprising a copper foil layer, a copper plating layer, and a gold-nickel plating layer.

25. A display device according to claim 23, wherein the bus line produced by plating forms a layered structure comprising a copper foil layer, a copper plating layer, and a gold-nickel plating layer.

26. A display device according to claim 16, wherein the bus line is

formed by selective depositing in which a thin, electrically conductive layer is formed in advance and a plurality of different metal layers are selectively deposited on the electrically conductive layer.

27. A display device according to claim 17, wherein the bus line is
5 formed by selective depositing in which a thin, electrically conductive layer is formed in advance and a plurality of different metal layers are selectively deposited on the electrically conductive layer.

28. A display device according to claim 1, wherein, in place of the liquid crystal, a rare gas is filled between the substrates, and the rare gas
10 undergoes a plasma discharge to perform a display operation.

29. A method of producing a display device comprising the steps of preparing a film substrate having a bus line on a surface thereof and a via hole in the interior thereof, bonding the film substrate to a peripheral portion of an active matrix substrate, and electrically connecting the bus line to a driver circuit section comprising a plurality of polycrystalline silicon thin film transistors via a via hole, wherein;
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the bonding of the film substrate and the active matrix substrate comprises semi-curing an adhesive, carrying out an alignment compensation of the film substrate and the active matrix substrate subsequent to the semi-curing, and curing the adhesive to secure the film substrate and the active matrix substrate.
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30. A method of producing a display device according to claim 29,

DETAILED DESCRIPTION

wherein a temperature in the curing is in the range of from 120°C to 150°C.

31. A method of producing a display device comprising an active matrix substrate having a driver circuit section composed of a plurality of polycrystalline silicon thin film transistors, a counter substrate, a liquid crystal filled between the active matrix substrate and the counter substrate, and an individually-wired line array for supplying electric power or a signal such as a clock signal and a data signal to a plurality of circuit elements comprised in the driver circuit section, wherein the individually-wired line array is extended to a peripheral portion of the active matrix substrate, said method comprising:

forming an insulator in the peripheral portion of the active matrix substrate, forming a via hole in the insulator, and forming a bus line by printing.

32. A method of producing a display device according to claim 31, wherein the via hole is formed by laser irradiation.

33. A method of producing a display device, comprising:

forming a driver circuit section using a polycrystalline silicon thin film transistor;

20 forming an insulating film on a thin film wiring region including the driver circuit section;

forming a via hole by etching a prescribed portion of the insulating film by photolithography so that a prescribed portion of a wiring electrode of the driver circuit section is exposed;

printing a prescribed pattern on the insulating film with an electrically conductive ink; and

electrically connecting the pattern to the wiring electrode of the driver circuit section via the via hole.

5 34. A method of producing a display device, comprising:

forming a driver circuit section using a polycrystalline silicon thin film transistor;

printing an insulating film for forming a via hole in a prescribed position in a thin film wiring region including the driver circuit section such 10 that a portion of the thin film wiring electrode is exposed;

printing a prescribed pattern using an electrically conductive ink; and

electrically connecting the pattern with the wiring electrode of the driver circuit section via the via hole.

35. A method of producing a display device, comprising:

15 forming a driver circuit section using a polycrystalline silicon thin film transistor;

forming a planarizing film over a pixel region and a thin film wiring line region including the driver circuit section by applying a transparent insulating film;

20 providing a via hole at a plurality of a prescribed position in the thin film wiring line region and the pixel region by a photolithography and an etching process;

patterning a transparent conductive film on a prescribed position of the

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planarizing film; and

printing a wiring line for supplying electric power to the driver circuit over the planarizing film including the transparent conductive film.

36. A method of producing a display device, comprising:

5 forming, on an active matrix substrate, a liquid crystal display unit and a driver circuit section for driving the liquid crystal display unit, the liquid crystal display unit having a matrix array composed of thin film transistors;

forming a resist layer on the active matrix substrate;

10 removing a portion of the resist layer where a recessed groove is to be formed by exposing and developing the resist layer;

forming a recessed groove by etching so as to recess a portion of the active matrix substrate where the portion of the resist layer has been removed;

15 forming a metal wiring line in the recessed groove; and

subsequent to the forming a metal wiring line, detaching the resist layer from the insulating substrate.

37. A method of producing a display device according to claim 36, wherein the etching is chemical etching using an etchant solution.

20 38. A method of producing a display device according to claim 36, wherein the etching is sandblasting.